Pike County School District
Standards Mastery Document

2nd Grade Mathematics
Revised 2019

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2nd Grade Mathematics

The Standards Mastery Document is designed for educators by educators as a resource and tool to help educators increase their depth of understanding of the Common Core Standards. This document will enable teachers to plan College & Career Ready curriculum and classroom instruction that promotes inquiry and higher levels of cognitive demand.

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education.

8 Mathematical Practices (MP):

MP 1. Make sense of problems and persevere in solving them.
MP 2. Reason abstractly and quantitatively.
MP 3. Construct viable arguments and critique the reasoning of others.
MP 4. Model with mathematics.
MP 5. Use appropriate tools strategically.
MP 6. Attend to precision.
MP 7. Look for and make use of structure.
MP 8. Look for and express regularity in repeated reasoning.

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Kentucky Academic Standards for Mathematics: Grade 2 Overview

Operations/Algebraic Thinking (OA)	Number and Operations in Base Ten (NBT)	Measurement and Data (MD)	Geometry (G)
• Represent and solve problems involving addition and subtraction. • Add and subtract within 20. • Work with equal groups of objects to gain foundations for multiplication.	• Understand place value. • Use place value understanding and properties of operations to add and subtract.	• Measure and estimate lengths in standard units. • Relate addition and subtraction to length. • Work with time and money. • Understand and apply the statistics process.	• Reason with shapes and their attributes.

In grade 2, instructional time should focus on four critical areas:

1. In the Number and Operations in Base Ten domain, students will:

- extend their understanding of the base-ten system. This includes ideas of counting in fives, tens and multiples of hundreds, tens and ones, as well as number relationships involving these units, including comparing; and
- understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).

2. In the Operations and Algebraic Thinking and Numbers and Operations in Base Ten domains, students will:

- use their understanding of addition to develop fluency with addition and subtraction within 100;
- solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss and use efficient, accurate and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations; and
- select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.

3. In the Measurement and Data domain, students will:

- recognize the need for standard units of measure (centimeter and inch) and use rulers and other measurement tools with the understanding that linear measure involves an iteration of units; and
- recognize that the smaller the unit, the more iterations needed to cover a given length.

4. In the Geometry domain, students will:

- describe and classify shapes as polygons or non-polygons;
- investigate, describe and reason about decomposing and combining shapes to make other shapes; and
- draw, partition and analyze two-dimensional shapes to develop a foundation for understanding area, congruence, similarity and fractions in later grades.

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Table 1
Common Addition and Subtraction Situations[1]

	Result Unknown	Change Unknown	Start Unknown
Add To	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2+3=**?**	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2+**?**=5	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? **?**+3=5
Take From	Five apples were on the table. I ate two apples. How many apples are on the table now? 5–2=**?**	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5-**?**=3	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? **?**–2=3
	Total Unknown	**Addend Unknown**	**Both Addends Unknown3**
Put Together/ Take Apart[2]	Three red apples and two green apples are on the table. How many apples are on the table? 3+2=**?**	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + **?** = 5, 5 – 3 = **?**	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2
	Difference Unknown	**Bigger Unknown**	**Smaller Unknown**
Compare	**("How many more?" version):** Lucy has two apples. Julie has five apples. How many more apples does Lucy have than Julie?	**(Version with "more"):** Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have?	**(Version with "more"):** Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have?
	("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + **?** = 5, 5 – 2 = **?**	(Version with "fewer"): Lucy has three fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = **?**, 3 + 2 = **?**	(Version with "fewer"): Lucy has three fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 – 3 = **?**, **?** + 3 = 5

Blue shading indicates the four Kindergarten problem subtypes. Students in grades 1 and 2 work with all subtypes and variants (blue and green). Yellow indicates problems that are the difficult four problem subtypes students in grade 1 work with but do not need to master until grade 2.

1 Adapted from Box 2-4 of National Research Council (2009, op. cit., pp. 32, 33).

2 These *take apart* situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean *makes* or *results in* but always does mean *is the same number as*.

3 Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation especially for small numbers less than or equal to 10. 4 For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using *more* for the bigger unknown and using *less* for the smaller unknown). The other versions are more difficult.

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Table 2
Common Multiplication and Division Situations1

	Unknown Product	Group Size Unknown	Number of Groups Unknown
	3×6=**?**	**3 × ? = 18 and 18 ÷ 3 = ?**	**? × 6 = 18 and 18 ÷ 6 = ?**
Equal Groups	There are 3 bags with 6 plums in each bag. How many plums are there in all? Measurement example: you need 3 lengths of string, each 6 inches long. How much string will you need all together?	If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? Measurement example: you have 18 inches of string which you will cut into 3 equal pieces. How long will each piece of string be?	If 18 plums are to be packed 6 to a bag, then how many bags are needed? Measurement example: you have 18 inches of string which you will cut into pieces that are 6 inches long. How many pieces of string will you have?
Arrays[2] Area[3]	There are three rows of apples with 6 apples in each row. How many apples are there? Area example: what is the area of a 3 cm by 6 cm triangle?	If 18 apples are arranged into 3 equal rows, how many apples will be in each row? Area example: a rectangle has area of 18 square centimeters. If one side is 3 cm long, how long is a side next to it?	If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? Area example: a rectangle has area of 18 square centimeters. If one side is 6 cm long, how long is the side next to it?
Compare	A blue hat costs $6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? Measurement example: a rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?	A red hat costs $18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? Measurement example: a rubber band is stretched to be 18 cm long and is 3 times as long as it was at first. How long was the rubber band at first?	A red hat costs $18 and a blue hat costs $6. How many times as much does the red hat cost as the blue? Measurement example: a rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?
General	***a×b=?***	***a × ? = p and p ÷ a = ?***	***? × b =p and p ÷ b = ?***

1 The first examples in each cell are examples of discrete things. These are easier for students and should be given before the measurement examples.

2 The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: the apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.

3 Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations.

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Table 3 Properties of Operations

The variables *a*, *b* and *c* stand for arbitrary numbers in a given number system.
The properties of operations apply to the rational number system, the real number system and the complex number system.

Associative property of addition	$(a + b) + c = a + (b + c)$
Commutative property of addition	$a+b=b+a$
Additive identity property of 0	$a+0=0+a=a$
Existence of additive inverses	For every a there exists –a so that a + (-a) = (-a) + a = 0
Associative property of multiplication	$(a \times b) \times c = a\ x\ (b \times c)$
Commutative property of multiplication	$a \times b = b \times a$
Multiplicative identity property of 1	$a \times 1 = 1 \times a = a$
Existence of multiplicative inverses	For every $a \neq 0$ there exists 1/a so that $a \times 1/a = 1/a \times a = 1$
Distributive property of multiplication over addition	$a \times (b + c) = a \times b + a \times c$

Table 4 Properties of Equality

The variables *a*, *b* and *c* stand for arbitrary numbers in the rational, real or complex number systems.

Reflexive property of equality	$a=a$
Symmetric property of equality	If $a = b$, then $b = a$
Transitive property of equality	If $a = b$ and $b = c$, then a=c
Addition property of equality	If a = b, then a + c = b + c
Subtraction property of equality	If a = b, then a – c = b – c
Multiplication property of equality	If a = b, then a x c = b x c
Division property of equality	If a = b and $c \neq 0$, then a ÷ c = b ÷ c
Substitution property of equality	If a = b, then b may be substituted for a in any expression containing a.

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Table 5 Properties of Inequality

The variables *a*, *b* and *c* stand for arbitrary numbers in the rational or real number systems.

Exactly one of the following is true: a < b, a = b, a > b
If a > b and b > c then a > c
If a > b, then b < a
If a > b, then –a < -b
If a > b, then a ± c > b ± c
If a > b and c > 0, then a x c > b x c
If a > b and c < 0, then a x c < b x c
If a > b and c > 0, then a ÷ c > b ÷ c
If a > b and c < 0, then a ÷ c < b ÷ c

Table 6
Fluency Standards across All Grade Levels

Grade	Coding	Fluency Standards
K	**KY.K.OA.5**	Fluently add and subtract within 5.
1	**KY.1.OA.6**	Fluently add and subtract within 10.
2	**KY.2.OA.2 KY.2.NBT.5**	Fluently add and subtract within 20. Fluently add and subtract within 100.
3	**KY.3.OA.7 KY.3.NBT.2**	Fluently multiply and divide within 100. Fluently add and subtract within 1000.
4	**KY.4.NBT.**	Fluently add and subtract multi-digit whole numbers using an algorithm.
5	**KY.5.NBT.5**	Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.
6	**KY.6.NS.2 KY.6.NS.3 KY.6.EE.2**	Fluently divide multi-digit numbers using an algorithm. Fluently add, subtract, multiply and divide multi-digit decimals using an algorithm for each operation. Write, read and evaluate expressions in which letters stand for numbers.

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Operations and Algebraic Thinking

Standard: 2.OA.1

Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, by using drawings and equations with a symbol for the unknown number to represent the problem.

Enduring Skill:

MP 1: Make sense of problems and persevere in solving them.
MP 2: Reason abstractly and quantitatively.
MP 4: Model with mathematics.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Know how to identify whole to part and part to whole relationships when solving problems (part-part-whole) Know how to solve 1 and 2-digit addition/subtraction computation problems.	Students flexibly model or represent addition and subtraction situations or context problems (involving sums and differences within 100.)	Students master all world problems subtypes including the four difficult ones: • Add-to-start unknown • Take from-start unknown • Put together/take apart-addend unknown • Compare/bigger unknown/smaller unknown

Coherence KY.1.OA.1→KY.2.OA.1→KY.3.OA.8

*Note: Drawings need not show detail, but accurately represent the quantities involved in the task.

**See Table 1

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Operations and Algebraic Thinking

Standard: 2.OA.2

Fluently add and subtract within 20 using mental strategies.

Enduring Skill:

MP 2: Reason abstractly and quantitatively.
MP 7: Look for and make use of structure.
MP 8: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Students use a range of non-count-by-one strategies: Count on count back from (e.g. 17-3, as 16, 15, 14; answer 14) From down to (e.g. 17-14 as 16, 15, 14; answer 3) Fluently add/subtract within 10 using mental strategies	Students determine addition and subtraction strategies efficiently, accurately, flexibly, and appropriately. *Being fluent means students choose flexibly among methods and strategies to solve contextual and mathematical problems.*	Students understand and explain their approaches and they produce accurate answers efficiently and appropriately use mental math strategies that include: • Counting on • Making ten • Decomposing a number leading to a ten • Using the relationship between addition and subtraction • Creating equivalent but easier or known sums

KY.2.NBT.5 Coherence KY.1.OA.6→KY.2.OA.2

Note: Reaching fluency is an ongoing process that will take much of the year.

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Operations and Algebraic Thinking

Standard: 2 OA.3

Determine whether a group of objects (up to 20) has an odd or even number of members; write an equation to express an even number as a sum of two equal addends.

Enduring Skill:

MP 2: Reason abstractly and quantitatively
MP 7: Look for and make use of structure.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Use concrete models to explore whether numbers can be decomposed (broken) into two equal parts Basic addition to 20	Skill counting using manipulatives, such as 100 charts and discuss number patterns as they relate to odd and even numbers. Students understand a number can be broken apart by pairing objects to see If there are leftovers (odd) and not (even). 	The sum of 2 equal addends (doubles) = even sum Recognize odd numbers are represented by addition facts using doubles plus one Make a connection to addition equations such as "The sum is always even when adding two even numbers." "The sum is always odd when adding an even and odd number" Using the strategy of breaking apart identifying if a number is odd/even and tell how you know.

Coherence KY.1.OA.7→KY.2.OA.3→KY.3.OA.9

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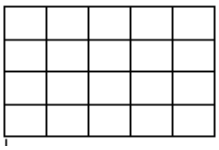
Operations and Algebraic Thinking

Standard: 2.OA.4

Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

Enduring Skill:

MP 2: Reason abstractly and quantitatively.
MP 4: Model with mathematics

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Know the difference of a row and a column Identify a square and a rectangle Basic addition to 20	Students model using rectangular arrays to determine the number of objects.	Given the dimensions of an array, students construct array determine the total number of tiles (squares on grid paper) and explain how they arrived at that number Discuss reasoning of an array's dimensions and prove reasoning by writing an equation to express the total sum of equal addends For example, the array shows 4+4+4+4+4=20 5+5+5+5=20 

Coherence KY.1.OA.7→KY.2.OA.4→KY.3.OA.1

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Number Base Ten

Standard: 2.NBT.1

Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones
Understand the following as special cases:

a. 100 can be thought of as a bundle of ten tens – called a "hundred"
b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (0 tens and 0 ones).

Enduring Skill:

MP 2: Reason abstractly and quantitatively.
MP 7: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Know how to sequentially say and write numbers to 100 Know how to skip count by various numbers to 100 Ability to use base 10 manipulatives to show various numbers	Identify a bundle of tens as a "hundred" Skip count by 100 Students unitize or understand 10 tens as a group or unit called 1 hundred.  is the same as   6 hundreds are the same as 600	Know the relationship between the numeric number form and the word form such as 100 refers "one", 200 refers to two, etc…. (and 0 tens and 0 ones) Explain the value of each digit in a 3-digit number

Coherence KY.1.NBT.2→KY.2.NBT.1→KY.3.NBT.1

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Number Base Ten

Standard: 2.NBT.2

Count forwards and backwards within 1000; skip-count by 5s, 10s, and 100s

Enduring Skill:

MP 1: Make sense of problems and persevere in solving them.
MP 6: Attend to precision.
MP 8: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Know how to sequentially say and write numbers within 1,000 Ability to skip count within 100 using the hundreds chart	Skip count by 5's, 10's and 100's within 1,000 Count sequentially forward and backward within 1,000 Students start at various numbers to skip-count. Some use tools such as base ten blocks, hundreds charts, number lines and money.	Explain the pattern when skip counting by 5s, 10s, and 100s. Skip-count from numbers other than the multiple (by 10 starting at 43, 62, 78) Ability to determine patterns when skip-counting

Coherence KY.1.NBT.1→KY.2.NBT.2

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Number Base Ten

Standard: 2.NBT.3

Read and write numbers to 1000 using base ten numerals, number names and expanded form.

Enduring Skill:

MP 7: Look for and make use of structure.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Recognize numbers to 1,000 Orally recite numbers in sequential order to 1,000 Understanding the vocabulary that 1 hundred is made up of 10 tens	Given a number within 1,000, students need to distinguish and identify different forms of the given number using base ten blocks	When given a number within 1,000, students should be able to convert into standard, expanded, written, and visual model using base ten blocks 739, seven hundred thirty-nine, 700+30+9 When comparing two three-digit numbers, students interpret the inherent value of each digit (234 is two hundreds, three tens, and four ones) and determine which number is larger.

Coherence KY.1.NBT.1→KY.2.NBT.3

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Number Base Ten

Standard: 2.NBT.4

Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Enduring Skill:

MP 2: Reason abstractly and quantitatively.
MP 6: Attend to precision.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Know that "more" means greater Know that "fewer" also means less	Identify/Record the comparison symbols<, >, = with correct terminology Students use base ten blocks, hundred charts and/or number lines when comparing two three-digit numbers using the symbols <, >, and =.	Explain a process for determining whether a three-digit number is greater than, less than, or equal to another three-digit number Apply place value knowledge to make comparisons (e.g., Look at greatest place value first and compare those digits to see which is greater) Know that changing the order of the digits impacts the symbols and their meanings (extension of 2 digit to 3-digit numbers)

Coherence KY.1.NBT.3→KY.2.NBT.4

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Number Base Ten

Standard: 2.NBT.5

Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Enduring Skill:

MP 2: Reason abstractly and quantitatively.

MP 8: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	Do: *What skill must the student demonstrate?*	Mastery: *How does the student demonstrate the learning of the standard?*
Knowledge of fact families Add/subtract with concrete models and drawings with sums to 100 using place value understanding.	Students solve addition and subtraction tasks (with sums and differences within 100) efficiently, accurately, flexibly, and appropriately. Model regrouping using base ten manipulatives	*Being fluent means students choose flexibly among methods and strategies to solve contextual and mathematical problems, they understand and explain their approaches and they produce accurate answers efficiently.* 45+36=  Students can solve this problem many ways. Student one counted the tens first, so 10, 20, 30, 40, 50, 60, 70. Then they counted the ones, 71, 72, 73, 74, 75, 76, 77,78,79,80,81. So 45+36=81. Student two broke 36 into 30=1=5. Then gave five from 36 to the 45 to make 50 because 50 is a friendly number. Then added 30+50 to make 80. Finally added 1 to 80 to get 81. So, 45+36=81.

Coherence KY.1.NBT.4→KY.2.NBT.5→KY.3.NBT.2

Note: Reaching fluency is an ongoing process that will take much of the year. Students are not expected to use an algorithm for addition and subtraction until grade 4.

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Number Base Ten

Standard: 2.NBT.6

Add up to four two-digit numbers using strategies based on place value and properties of operations.

Enduring Skill:

MP 2: Reason abstractly and quantitatively.
MP 7: Look for and make use of structure.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Add three 2-digit numbers using concrete materials	Add up to four two-digit numbers with/without regrouping by applying various strategies	Add columns of two-digit numbers with up to four addends using place value understanding, mental math (number sense), and properties of addition (commutative, associative, and identity) Identify and Explain strategy being used to solve problem (orally and/or written)

Coherence KY.1.OA.2→KY.2.NBT.6

Note: Students are not expected to know a standard algorithm until grade 4.

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Number Base Ten

Standard: 2.NBT.7

Add and subtract within 1000

a. Represent and solve addition and subtraction problems using…
    - concrete models or drawings
    - strategies based on place value
    - properties of operations;
    - the relationship between addition and subtraction and;
    - relate drawings and strategies to expressions or equations
b. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

Enduring Skill:

MP 1: Make sense of problems and persevere in solving them.
MP 5: Use appropriate tools strategically.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Knowledge that the placement of a digit affects the value of that digit Build numbers within 1,000 using various manipulatives	Students model with concrete tools to build on previous place value understandings. For example, students can see the relationship of addition and subtraction by counting up from 87 to get to 243 and realize that there is a difference of 156.	Use mental and written computation strategies to develop conceptual understanding and number sense of adding 2 & 3-digit numbers within 1,000 Use estimation to justify reasonableness of answer

Coherence KY.1.NBT.4→KY.2.NBT.7→3.NBT.2

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Number Base Ten

Standard: 2.NBT.8

Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.

Enduring Skill:

MP 7: Look for and make use of structure.
MP 8: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	**Do:** *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Skip count by 10 and 100 (forward & backward)	Students use a variety of tools and strategies to add or subtract 10 or 100 from a three-digit number in the range of 100-900.	Mentally add/subtract 10 or 100 to any given number 100-900 Explain reasoning using place value understanding and patterns

KY.1.NBT.6 Coherence KY1.NBT.5→ KY.2.NBT.8→3.NBT.2

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Number Base Ten

Standard: 2.NBT.9

Explain why addition and subtraction strategies work, using place value and the properties of operations.

Enduring Skill:

MP 3: Construct viable arguments and critique the reasoning of others.
MP 7: Look for and make use of structure.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Relationship between addition and subtraction Identify the place and value of a given digit	Students support explanations with drawings and/or objects built on place value and properties of operations.	Students support explanations with drawings and/or objects built on place value and properties of operations.

KY.1.OA.4 Coherence KY.1.OA.3→KY.2.NBT.9

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Measurement and Data

Standards: 2. MD.1

Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

Enduring Skills:

MP 5: Use appropriate tools strategically
MP 6: Attend to precision

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Identify the meaning of length Identify measuring tools such as ruler, yardstick, meter stick and measuring tape	Students choose appropriate units and the related tools they need in order to measure.	Students are exposed to different situations where they choose the appropriate tool (s) to measure and explain why the student chose a specific tool.

Coherence KY.1.MD.2→KY.2.MD.1→KY.3.MD.5

Note: Recognize that all rulers do not align with 0 at the left and students must start with the first mark to measure

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Measurement and Data

Standards: 2.MD.2

Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

Enduring Skills:

MP 3: Construct viable arguments and critique the reasoning of others.
MP 5: Use appropriate tools strategically

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
How to accurately measure length in standard units using a selected measurement tool Know the appropriate tool to choose for measuring various objects Know where to begin, on measurement tools, when doing linear measurement	Select several appropriate units of length (e.g., inches, feet, centimeter, meter) to measure an object Accurately measure an object with two different unit lengths	Students measure an object using two different units and describe how the two measurements relate to the size of the unit chosen. (Students measure a door in inches and then in feet. Students relate the size and amount of each unit to discover more inches than feet are needed to measure the door.) Students notice it takes more of a smaller unit. For example, explaining a desk measured two feet because a foot is a longer unit, but measures 24 inches because an inch is smaller unit.

Coherence KY.1.MD.2→KY.2.MD.2

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Measurement and Data

Standards: 2. MD.3

Estimate lengths using units of inches, feet, yards, centimeters, and meters.

Enduring Skills:

MP 2: Reason abstractly and quantitatively.
MP 6: Attend to precision.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Know what it means to estimate Know how to accurately measure an object with the appropriate tool and unit of measure	Estimate the length of a given object using a variety of units. **Students understand estimates are not exact are not exact answers or reasonable guesses.*	Ability to use a benchmark when estimating and measuring Students accurately estimate lengths and use these estimates to determine measurement is reasonable, as well as to compare the lengths of objects. **Estimates are based on prior knowledge and the ability to reason about the appropriateness of their estimates.*

Coherence KY.1.MD.2→KY.2.MD.3

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Measurement and Data

Standards: 2. MD.4

Measure to determine how much longer one object is than another, expressing the length difference in terms of either a customary or metric standard length unit.

Enduring Skills:

MP 5: Use appropriate tools strategically.
MP 6: Attend to precision

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery:** *How does the student demonstrate the learning of the standard?*
Compare to see if one object is longer than another object using manipulatives Add/Subtract	Measure the length of any object in a given unit Students measure using appropriate tools and standard unit lengths to find the difference between the lengths.	Use comparative statements to describe the differences between two objects such as " This object is longer by 3 inches"

Coherence KY.2.MD.3→KY.2.MD.4→KY.2.MD.5

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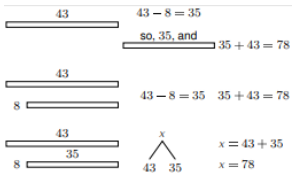
Measurement and Data

Standards: 2. MD.5

Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units by using drawings and equations with a symbol for the unknown number to represent the problem.

Enduring Skills:

MP 1: Make sense of problems and persevere in solving them.
MP 4: Model with mathematics.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: What skill must the student demonstrate?	**Mastery**: *How does the student demonstrate the learning of the standard*?
Add/Subtract within 100	Students use concrete models and/or representations such as drawings of rulers to make sense of adding and subtracting word problems involving length. For example, a girl had a 43 cm section of a necklace and another section that was eight cm shorter than the first. How long would the necklace be if she combined the two sections? 	Write an equation with a symbol for the unknown in the problem Explain verbally or written how the problem was solved

Coherence KY.2.MD.5→KY.3.MD.2

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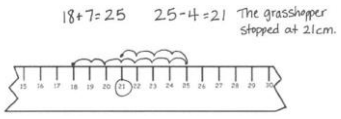
Measurement and Data

Standards: 2.MD.6

Represent whole numbers as lengths from 0 on a number line with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line.

Enduring Skills:

MP 3: Construct viable arguments and critique the reasoning of others.
MP 4: Model with mathematics.

Know: *What content does the student need to know to demonstrate this standard?*	Do: *What skill must the student demonstrate?*	Mastery: *How does the student demonstrate the learning of the standard?*
Use number lines to add (count on) and subtract (count back)	Students show their thinking of adding and subtracting quantities using a number line. For example, a grasshopper jumped seven cm forward and four cm back and then stopped. If the grasshopper started at 18cm, where did the grasshopper stop? 	Ability to use anchor points (half way) to make sense of problems Students use the number line to solve problems and compare strategies with a focus on which strategies are efficient for the given problem.

Coherence KY.2.MD.6→KY.3.NF.2

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Measurement and Data

Standards: 2. MD.7

Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

Enduring Skills:

MP 5: Use appropriate tools strategically.
MP 6: Attend to precision

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Skip count by 5's Tell and write time from an analog and digital clock to the hour and half hour	Students orally tell and write the time from both types of clocks to the nearest five minutes.	Explain the difference between a.m. and p.m. knowing there are 24 hours in a day with two twelve-hour cycles called a.m. and pm. Realize that a clock can be seen as a number line and determine the time to the nearest 5 minutes using number line.

KY.2.NBT.2 Coherence KY.1.MD.3→KY.2.MD.7→KY.3.MD.1

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Measurement and Data

Standards: 2. MD.8

Solve word problems with adding and subtracting within 100, not using dollars and cents simultaneously) using the $ and ¢ symbols appropriately (not including decimal notation).

Enduring Skills:

MP 1: Make sense of problems and persevere in solving them
MP 5: Use appropriate tools strategically.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Identify coins: penny, nickel, dime, and quarter Count money by combinations of coins through $1 Skip count by 5's and 10's	Identify and give the value of dollar bills, quarters, dimes, nickels, and pennies and count mixed sets of currency (dollars and cents) Ability to apply possible strategies such as drawing pictures, using coins, using a number grid, using a number line, using symbols and/or numbers when solving problems Students write equations to represent the problem situation, using units ($ or ¢) to correctly communicate the quantities.	Students add or subtract two coin values or dollar values, but not both in the same problem. • For example, if you have six dimes and three pennies, how many cents do you have? Students would understand six dimes is equal to 60 cents and three pennies is equal to three cents. Together, they would total 63 cents. • If Mary had $31 and Tommy gave her $22 for her birthday, how much money does Mary have now? 31+$22=$53

KY.2.OA.1 Coherence KY.1.MD.3→KY.2.MD.8

Note: Students are not introduced to decimals until grade 4.

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Measurement and Data

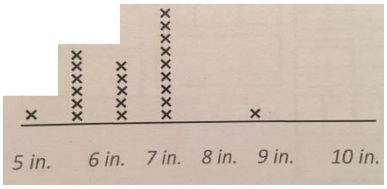
Standards: 2. MD.9

Investigate questions involving measurements.

a. Identify a statistical question focused on measurements
b. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object.
c. Show the measurements by making a dot plot, where the horizontal scale is marked off in whole-number units.

Enduring Skills:

MP 1: Make sense of problems and persevere in solving them.
MP 6: Attend to precision.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	Mastery: *How does the student demonstrate the learning of the standard?*
Measure and record the lengths of several objects to the nearest whole-number	Ability to answer questions when given a dot plot Record length measurements on a dot plot. Students select a graph that makes sense, recognizing a dot plot is for numeric data while bar and pictographs are categorical data.	Students gather information from a statistical question, generate measurements of objects from the nearest whole-number unit and create a dot plot like the one below. For example, as a class, how long are our feet with our shoes on?  Students analyze the data in their graphs, noticing relationships such as how many more fall in one category than another and relating those observations back to the original question they posed.

Coherence KY.2.MD.9→KY.3.MD.4

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Measurement and Data

Standards: 2.MD.10

Create a pictograph and a bar graph (with single-unit scale) to represent a data set up to four categories. Solve simple put together, take-apart and compare problems using information presented in a bar graph.

Enduring Skills:

MP 2: Reason abstractly and quantitatively.
MP 6: Attend to precision.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
How to organize and sort data based on selected attributes Verbally answer questions using a bar/picture graph	Collect, sort, and organize data Using data create a pictograph and a bar graph (with single-unit scale) to represent data up to four categories.	Solve simple problems by summarizing data and conclusions, comparisons and generalizations (make decisions based on the data) in the graph. **See Table 1**

Coherence KY.1.MD.4→KY.2.MD.10→KY.3.MD.3

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Geometry

Standard: 2.G.1

Recognize and draw shapes having specified attributes, such as a given number of angles or sides. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (identify number of faces).

Enduring Skills:

MP 3: Construct viable arguments and critique the reasoning of others.
MP 7: Look for and make use of structure

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Identify basic 2-D shapes Identify basic 3-D shapes	Build and draw shapes to possess defining attributes	Describe similarities and differences between two-dimensional and three-dimensional shapes given specific attributes Compare directly and visually the size of 2-D and 3-D shapes (not compared by measuring)

Coherence KY.1.G.1→KY.2.G.1→KY.3.G.1

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Geometry

Standards: 2.G.2

Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

Enduring Skills:

MP 6: Attend to precision.

MP 8: Look for and express regularity in repeated reasoning.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Use tiles to build an array Know the difference between a row and a column.	Draw rows and columns of equal size in a rectangle greater than 5 rows and 5 columns Count the equal size squares in a rectangle to find the total number of squares Know the definition of equal sharing and partitioning (dividing)	Tell how the shape was partitioned into squares. When given a number, the students can partition tiles in rows and columns to = the given number

Coherence KY.2.G.2→KY.3.MD.6

Note: The rectangle should not be divided up into anything larger than five rows and five columns to correlate with KY.2.OA.4.

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Geometry

Standards: 2.G.3

Partition circles and rectangles into two, three, or four equal shares; describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

Enduring Skills:

MP 2: Reason abstractly and quantitatively.

MP 3: Construct viable arguments and critique the reasoning of others.

Know: *What content does the student need to know to demonstrate this standard?*	**Do**: *What skill must the student demonstrate?*	**Mastery**: *How does the student demonstrate the learning of the standard?*
Equally divide rectangles and circles using concrete materials (e.g., paper folding, geoboards, fraction manipulatives)	Partition (divide) a circle and rectangle into two, three, or four equal parts of a whole Describe the equal shares with words (e.g., halves, thirds, fourths) Students explore rectangles and circles being partitioned in multiple ways to recognize that equal shares may be different shapes within the same whole.  halves thirds fourths	Describe the whole as two halves, three thirds, or four fourths Describe a whole by the number of equal parts (e.g., two halves make a whole) Explain and give examples to show that halves, thirds, and fourths of an identical whole need not be the same shape (e.g., half of a rectangle can be shown horizontally or vertically)

Coherence KY.1.G.3→KY.2.G.3→KY.3.NF.1